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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/885,332	06/20/2001	Batakrishna Mandal	1391-24800 DJK	3294

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EXAMINER

STEVENS, THOMAS H

ART UNIT

PAPER NUMBER

2123

DATE MAILED: 10/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/885,332

Applicant(s)

MANDAL, BATAKRISHNA

Examiner

Thomas H. Stevens

Art Unit

2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 June 2000.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-17 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 20 June 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 20 June 2000.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-17 were reviewed.

Drawings

2. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Information Disclosure Statement

3. The listing of references in the specification (i.e., pages 1 and 10) is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited on form PTO-892, they have not been considered.
4. Furthermore, the reference by Graham Winbow "How to Separate Compressional and Shear Arrivals in a Sonic Log" lacked a publication date, thus was

not considered; while U.S. Patent application 6,631,327 was crossed off because the filing date of the patent (9/21/01) was after the application filing date for application number 09/885332.

Claim Interpretation

5. Office personnel are to give claims their "**broadest reasonable interpretation**" in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. *In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969). See *also *In re Zletz*, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) ("During patent examination the pending claims must be interpreted as broadly as their terms reasonably allow") The reason is simply that during patent prosecution when claims can be amended, ambiguities should be recognized, scope and breadth of language explored, and clarification imposed An essential purpose of patent examination is to fashion claims that are precise, clear, correct, and unambiguous. Only in this way can uncertainties of claim scope be removed, as much as possible, during the administrative process. The examiner takes the position the simplicity of inverting a Fourier transform.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

7. Regarding claims 10, 13 and 15 the word "associated" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

8. Furthermore, claim 17, the word "enhance" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Chang (U.S. Patent 5,077,697 (1991)). Chang teaches methods and apparatus for sonic borehole logging of formation shear using discrete frequency measurements (abstract).

Claim 1. An acoustic logging (column 2, lines 60-67) tool that comprises: an acoustic source configured to excite wave propagation in a quadrupole mode (column 3, lines 33-35); an array of acoustic receivers (column 4, lines 20-25); and an internal controller

configured to record signals (column 6, lines 25-30) from each of the acoustic receivers and configured to process the signals to determine a shear wave propagation slowness for a formation surrounding the acoustic logging tool.

Claim 2. The acoustic logging tool of claim 1, (column 2, lines 60-67; column 4, lines 20-25; column 6, lines 25-30; column 3, lines 33-35) wherein the acoustic source is a quadrupole source.

Claim 3. The acoustic logging tool of claim 2, (column 2, lines 60-67; column 4, lines 20-25; column 6, lines 25-30; column 3, lines 33-35) wherein the acoustic source includes four source elements (column 3, lines 55-60) that are equally spaced about the circumference of the logging tool, and wherein opposing elements are excited in-phase, and elements 90° apart are excited in inverse-phase (column 3, lines 32-43).

Claim 4. The acoustic logging tool of claim 3, (column 2, lines 60-67; column 4, lines 20-25; column 6, lines 25-30; column 3, lines 33-35) wherein each source element includes a piezoelectric transducer (column 3, lines 11-15 and 31-36).

Claim 5. The acoustic logging tool of claim 1, (column 2, lines 60-67; column 4, lines 20-25; column 6, lines 25-30; column 3, lines 33-35) wherein the array of acoustic receivers includes a set of four receiver elements at each of a plurality of positions along the

longitudinal axis (column 3, lines 50-55) of the logging tool, wherein the receiver elements of each set are equally spaced about the circumference of the logging tool.

Claim 6. The acoustic logging tool of claim 5, (column 2, lines 60-67; column 4, lines 20-25; column 6, lines 25-30; column 3, lines 33-35; column 3, lines 50-55) wherein the acoustic source includes four source elements that are equally spaced about the circumference of the logging tool, and wherein each of the source elements is aligned with a respective one of the receiver elements in each set of receiver elements (columns 12 and 13, lines 66-67 and 1-4, respectively).

Claim 7. The acoustic logging tool of claim 5, (column 2, lines 60-67; column 4, lines 20-25; column 6, lines 25-30; column 3, lines 33-35; column 3, lines 50-55) wherein the internal controller inverts signals (see claim interpretation) from two opposing receiver elements in each set of receiver elements and combines the inverted signals with signals from the remaining two receiver elements in the set of receiver elements to obtain a combined signal for each set of receiver elements.

Claim 8. The acoustic logging tool of claim 7, (column 2, lines 60-67; column 4, lines 20-25; column 6, lines 25-30; column 3, lines 33-35; column 3, lines 50-55) wherein each of the receiver elements includes a piezoelectric transducer (column 3, lines 11-15 and 31-36).

Art Unit: 2123

Claim 9. The acoustic logging tool of claim 1, (column 2, lines 60-67; column 4, lines 20-25; column 6, lines 25-30; column 3, lines 33-35) wherein the internal controller is configured to determine a phase semblance as a function of frequency and slowness from the receiver signals (column 2, lines 25-41).

Claim 10. The acoustic logging tool of claim 9, (column 2, lines 60-67; column 4, lines 20-25; column 6, lines 25-30; column 3, lines 33-35; column 2, lines 25-41) wherein the internal controller is configured to identify a phase semblance peak associated with each of a plurality of frequencies (column 6, lines 55-65) and wherein the internal controller is configured to identify a smallest slowness (column 2, lines 50-58 with figure 3) value associated with the phase semblance peak as the shear wave propagation (column 2, lines 25-41) slowness for the formation.

Claim 11. The acoustic logging tool of claim 1, (column 2, lines 60-67; column 4, lines 20-25; column 6, lines 25-30; column 3, lines 33-35) wherein the tool is configured for logging while drilling (column 9, lines 21-36).

Claim 12. The acoustic logging tool of claim 1, (column 2, lines 60-67; column 4, lines 20-25; column 6, lines 25-30; column 3, lines 33-35) wherein the source excites waves having frequencies greater than 2 kHz (column 12, lines 65-67).

Claim 13. A method of determining the shear wave propagation slowness of a formation (column 2, lines 21-41), the method comprising: exciting waves that propagate along a borehole in quadrupole mode (column 12, lines 30-56; column 13, lines 12-38); receiving acoustic signals at each of a plurality of positions along the borehole (column 6, lines 25-27); and calculating, from the acoustic signals, slowness values associated with a peak phase (column 2, lines 50-58 with figure 3) semblance as a function of frequency.

Claim 14. The method of claim 13, (column 2, lines 21-41; column 12, lines 30-56; column 13, lines 12-38; column 6, lines 25-27; column 2, lines 50-58 with figure 3) wherein the peak phase semblance (column 6, lines 25-30) is associated with a borehole interface wave.

Claim 15. The method of claim 13, (column 2, lines 21-41; column 12, lines 30-56; column 13, lines 12-38; column 6, lines 25-27; column 2, lines 50-58 with figure 3) further comprising: determining a minimum slowness value associated (column 2, lines 32-35) with the peak phase semblance (column 6, lines 25-30).

Claim 16. The method of claim 15, (column 2, lines 21-41; column 12, lines 30-56; column 13, lines 12-38; column 6, lines 25-27; column 2, lines 50-58 with figure 3; column 2, lines 32-35; column 6, lines 25-30) further comprising: providing the

Art Unit: 2123

minimum slowness value (column 14, lines 20-25) as an estimate of the shear wave propagation slowness.

Claim 17. The method of claim 13, (column 2, lines 21-41; column 2, lines 32-35; column 12, lines 30-56; column 13, lines 12-38; column 6, lines 25-27; column 2, lines 50-58 with figure 3) further comprising: processing the acoustic signals to enhance the quadrupole response of a receiver array before said act of calculating slowness values (column 2, lines 30-35).

Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mr. Tom Stevens whose telephone number is (703) 305-0365, Monday-Friday (8:00 am- 4:30 pm) or contact Supervisor Mr. Kevin Teska at (703) 305-9704. The fax number for the group is 703-872-9306.

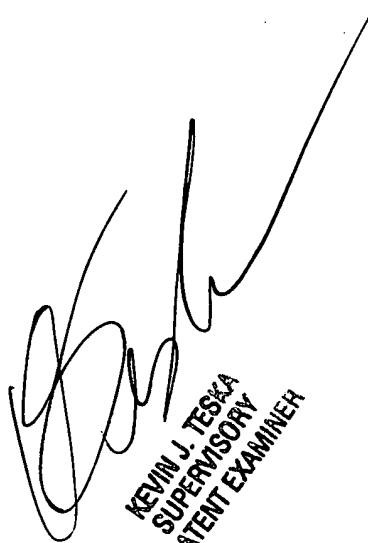
Any inquires of general nature or relating to the status of this application should be directed to the Group receptionist whose phone number is (703) 305-3900.

October 5, 2004

Application/Control Number: 09/885,332
Art Unit: 2123

Page 10

THS



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